NOAA
S 221

LIST OF SHELL OPENINGS

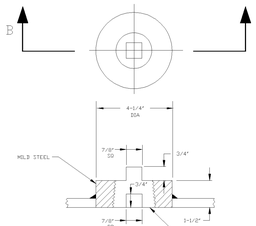
ITEM NO	DESCRIPTION	SIZE OF OPENING	SIDE OF SHIP	FWD	AFT	FR	DIST FRM ℄ CUT TO ℄ OF SHIP	HGT TO CTR ABV KEEL	REMARKS
1	LODAR VERTICAL TRANSDUCER	12"X6-1/2"	S		10"	29	6"		
2	TRANSDUCER OPENING	10-1/8"	S			30	12"		
3			P			30			
4			S			43			
5			P			43			
6			S			45			
7			P			45			
8			S			47			
9			P			47			
10	7192 TRANSDUCER	2-1/2"	S		11"	42	6"		
11	TRANSDUCER HOUSING ON SKEG	7'3 X 2'0	CL	——	6"	98	——		
12	SAMPLING SEA CHEST	15-1/2"	S		8"	11	4'-0"	4'-0"	
13	LODAR SEA CHEST	12-1/2"	CL		10"	11	——		HULL 197 ONLY
14	BOW THRUSTER SEA CHEST	9"	P		10"	14		3'-6"	
15	HIGH SUCTION SEA CHEST	15-1/2"	P/S		8"	58		5'-0"	
16	LOW SUCTION SEA CHEST		P/S		18"	59	8'10-1/2"		
17	BALLAST SEA CHEST		S		8"	67	3'-8"		
18	FIRE PUMP SEA CHEST		P		10"	71	9'-6"		
19	CATHODIC PROTECTION ANODE		P		10"	12		5'-6"	
20			P/S		——	30	13'6-1/2"		
21			P		10"	69	16'-0"		
22			S		10"	107	16'-3/4"		
23	GARBAGE CHUTE	12"	P		8"	47	SHELL	14'-7"	
24	DBLR FOR UNDERWATER LDG	7" X 3"	P		10"	56	18"		
25	STORM OIL TANK DVBD DISCH	1"	P/S		8"	0	SHELL	15'-6"	
26	BILGE DISCH	3"	P		10"	3		14'-3"	
27	FREEZER & REFER DR. TK. DVBD DISCH	1-1/2"	S	8"		31		14'-0"	
28		1"	S		8"	37		14'0-1/2"	
29	OVERBOARD DISCHARGE	4" IPS	S		8"	46		10'7-1/2"	
30	DVBD DISCH SALT WATER COOLING	3"	S		10-1/8"	52		10'7-1/2"	
30A	DVBD DISCH SALT WATER COOLING	4"	P		10-1/8"	52		10'7-1/2"	
31	OVERBOARD DISCHARGE	4" IPS	S		10-1/8"	53		6'-6"	
32	DVBD DISCH BILGE PUMP	3"	P		10-1/8"	53		14'-3"	
33	BILGE DISCH	3"	P/S		11"	68		14'-5"	
34	DVBD DISCH.S.W. CLG	1-1/2"	P/S		10-1/8"	69		10'-2"	
35	DVBD DISCH SEWAGE SYS	4"	P		10"	71		9'-0"	
36	DVBD DISCH & D.D. TRANSFER SYS	3"	P		15"	76		14'-6"	
36A	OVERBOARD DISCHARGE	3"	P		15"	76		15'-0"	
37	OVERBOARD DISCHARGE	2" IPS	P		14"	108		14'-3"	
38	DRAFT GAUGE	2"	S		10"	13	6"		
39	DRAFT GAUGE IN SKEG	2"	CL		10"	103	——		
70	DECK DRAIN VALVE & SCUPPER	3"	P/S		10"	96	SHELL	14'-3"	
71	GALLEY DRAIN DVBD	2-1/2"	P		10"	64		14'-6"	
72	GALLEY DRAIN TANK DVBD	1"	P		11"	64		13'-9"	
73	OVERBOARD DISCHARGE	1-1/2"	P		10"	60		11'-6"	
74	DVBD DISCH SALT WATER COOLING	2"	S		10"	66		10'-9"	
75	BILGE DISCHARGE	3"	S		10"	62		14'-9"	
76	OVERBOARD DISCHARGE	2-1/2"	S		14"	53		15'-3"	
77	OVERBOARD DISCHARGE	1-1/2"	P/S		10"	31		14'-0"	
78	DECK DRAIN VALVE & SCUPPER	3"	P/S		11"	24		14'-9"	
79	OVERBOARD DISCHARGE	2"	P		10"	14		13'-2"	
80	OVERBOARD DISCHARGE	2"	P		10"	25		13'-6"	
81	STEAM GENERATOR BOTTOM BLOW	1-1/2"	P		8"	52		9'-6"	
82	SALT WATER SERVICE DVBD	1-1/2"	P		14"	53		10'-0"	
83	HYDROCHART ARRAY PORT	27" x 60"	P/S	1'-6"		26	SHELL	5'	
84	ELAC MULTIBEAM ARRAY	36" x 58"	P/S		6"	22	25"	8"	

MIDSHIP SECTION

STRUCT AT FR 57 SHOWN
PORT LKG AFT
SCALE: 1/4"=1'0"

HTS.-BILGE KEEL	
FRAME	HEIGHT ABL
44	4'1-1/4"
48	2'2-1/4"
52	1'9-3/4"
56	1'8"
60	1'0"
64	1'0"
68	2'3-1/2"
72	4'0-1/2"

BLEEDER PLUG LOC					
ITEM NO.	INCHES AFT	OF FRAME	DIM OFF CL	PORT OR STBD	
40	14	19	0'-7"	S	
41	14	28	0'-7"	P	
42	14	42	0'-8"	S	
43	14	42	0'-8"	P	
44	14	51	0'-7"	S	
45	14	51	0'-7"	P	
46	7	52	7'-5"	S	
47	8	52	0'-7"	P	
48	8	52	7'-5"	P	
49	7	67	5'-1"	S	
50	7	67	5'-1"	P	
51	14	69	0'-7"	S	
52	7	70	0'-7"	S	
53	7	70	0'-7"	P	
54	7	72	12'-7"	S	
55	7	72	12'-7"	P	
56	7	76	1'-6"	S	
57	7	76	1'-6"	P	
58	7	79	7'-7"	S	
59	7	79	7'-7"	P	
60	7	88	7'-7"	S	
61	7	88	1'-6"	S	
62	7	88	1'-6"	P	
63	7	88	7'-7"	P	
64	7	97	1'-6"	S	
65	7	97	1'-6"	P	
66	7	107	1'-6"	P	
67	20	113	ON CL FLOOR	S	
68	20	113	ON CL FLOOR	P	
69	18	9	CL	——	



SECTION B-B

TYP BLEEDER PLUG
FOR LOCATION SEE TABLE IN PANEL 7
SCALE: 6"=1'0"

GENERAL NOTES

1. THIS DWG HAS BEEN DEVELOPED FROM NOAA DWG FA-S0701-1, ALT 3. ALL INFORMATION FROM DWG FA-S0701-1 AND ALTERATIONS THERETO HAVE BEEN INCORPORATED INTO THIS DWG. IN ADDITION, HULL PENETRATIONS, TRANSDUCER LOCATIONS, AND OTHER UNDERWATER BODY FEATURES WERE VERIFIED, JAN 1990, BY SHIPCHECK OF THE NOAA SHIP RAINIER. △2
2. KEEL BLOCKS SHOWN ON PLAN ARE 14" x 14" x 4'0" LONG SPACED ON 3'9" CENTERS.
3. BLOCK ARRANGEMENT SHOWN IS FOR THE INITIAL DOCKING. (DOCKING POSITION NO. 1)
4. IN ORDER TO CLEAN AND PAINT THE ENTIRE BOTTOM OF THE VESSEL IN THREE SUCCESSIVE DOCKINGS, THREE DOCKING POSITIONS ARE GIVEN ON PLAN. DIMENSIONS SHOWN ARE FROM AFT REFERENCE POINT TO THE AFT SIDE OF THE AFTERMOST KEEL BLOCK.
5. BILGE BLOCKS ARE SPACED ON 12'0" CENTERS AND ARE LOCATED FOR THREE DOCKING POSITIONS AS SHOWN ON PLAN. FOR BILGE BLOCK HEIGHTS SEE DWG FA-S0501-1 MOLD LOFT OFFSETS BOOKLET.

REFERENCES

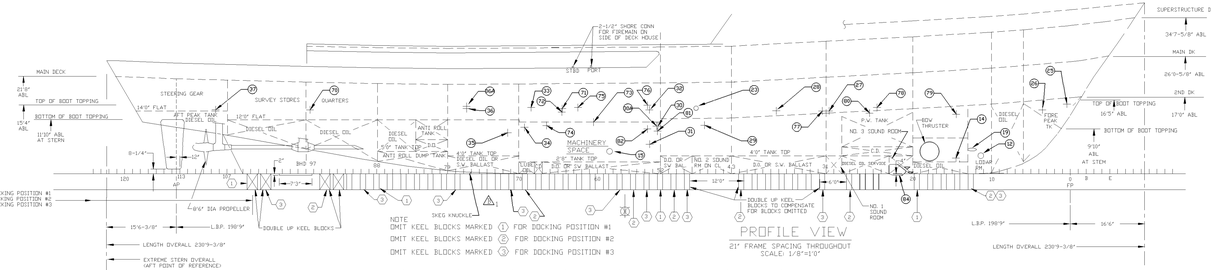
REF NO	DWG NO	TITLE
1	S22-1-1K	RUDDERS & RUDDER STOCKS
2	S19-5-1K	CATHODIC PROTECTION SYSTEM
3	S11-8-1K	STRUTS & FAIRWATERS
4	S43-2-1K	ARRGT & DETS STERN TUBE, STUFFING BOX & BEARINGS
5	S48-1-3	DOCKING & BLEEDER PLUGS
6	S11-2-3K	FRAMING-BOW THRUSTER, LODAR RM & 8'0" FLAT
7	S51-3-1L	DRAFT GAUGES-ARRGT & PIPING
8	S48-24-1	SEA CHESTS
9	S36-1-24K	GARBAGE RM & CHUTE
10	S48-5-1K	S.W. COOLING SYS MN ENGINES AND REDUCTION GEAR
11	S48-1-4L	BALLAST & D.D. TRANSFER SYS
12	S48-3-2L	ARRANGEMENT-FIREMAIN SYS
13	S11-13-4L	FOUNDATIONS FOR EQUIPMENT IN SOUND RMS NO. 1 & 2
14	S48-1-1	DIAGRAM OF BILGE SYSTEM
15	S48-7-3K	SEWAGE DISPOSAL SYSTEM

PRINCIPAL DIMENSIONS

LENGTH OVERALL	230'9-3/8"
LENGTH BETWEEN PERPENDICULARS	198'9"
BREADTH MOLDED	42'0"
DEPTH MOLDEDMN DK AT FR 71)	26'0"
FRAME SPACING	21"

REVISIONS

REV	ZONE	ITEM	DESCRIPTION	BY	DATE	APPD
A	ALL	1	GENERAL UPDATE TO INCORPORATE FEATURES FOUND DURING SHIPCHECK OF NOAA SHIP RAINIER ON DOCK 10 JAN 1990	ART ANDERSON ASSOCIATES PER TAM NO2-014-1993	MAY 1990	
	4H	2	MODIFIED VERIFICATION DATE IN NOTE 1			
	10C	3	MODIFIED TABLE OF PAINTED SURFACES TO SUIT PARABOLIC TOP OF BODY TOPPING			
	13D, 13E, VAR	4	ADDED ITEM NO'S 30A, 36A AND 70 THRU 82 TO LIST OF SHELL OPENINGS LOCATED THESE ITEMS ON PROFILE VIEW AND PLAN VIEW AS APPROPRIATE			
	13H, 13G, 13F	5	CORRECTED ITEM NO'S 1, 10, 14, 23 - 28, 30, 31 - 33 TO SUIT SHIPCHECK FINDINGS			
B	6D 6E	1	ADDED EXISTING KNUCKLE IN SKEG DELETED KEEL BLOCK IN WAY OF KNUCKLE	RAYMOND HERMES	NOVEMBER 26, 1997	
	4D 4E	2	ADDED NEW HYDROCHART ARRAY AND ARRAY DEFLECTOR GUARD, P/S DELETED HOLES IN WAY OF NEW HYDROCHART ARRAYS			
	13D	3	ADDED ITEM NO. 83 TO LIST OF SHELL OPENINGS			
	10A	4	MODIFIED THE BEARING ON BLOCKS TABLE TO REFLECT THE REDUCTION IN NUMBER OF KEEL BLOCKS			
C	4D 4E	1	DELETED HYDROCHART ARRAY AND ARRAY DEFLECTOR GUARD, P/S	RAYMOND HERMES	MAY 5, 1999	
	13D	2	DELETED ITEM NO. 83 FROM LIST OF SHELL OPENINGS			
	13D	3	ADDED ITEM NO. 84 TO LIST OF SHELL OPENINGS			
	4D 4E	4	ADDED NEW ELAC MULTIBEAM ARRAY AND ARRAY DEFLECTOR GUARD, P/S			
	4D 4E	5	MODIFIED ARRANGEMENT OF KEEL BLOCKS			
	10A	6	MODIFIED THE BEARING ON BLOCKS TABLE TO REFLECT THE CHANGE IN NUMBER OF KEEL BLOCKS			
			DRAWING REVISED TO CONFINE APPLICABILITY TO NOAA SHIP RAINIER ONLY	RAYMOND HERMES	MARCH 26, 2002	
	1A	1	MODIFIED DRAWING NUMBER AND TITLE			



NOTE
OMIT KEEL BLOCKS MARKED (1) FOR DOCKING POSITION #1
OMIT KEEL BLOCKS MARKED (2) FOR DOCKING POSITION #2
OMIT KEEL BLOCKS MARKED (3) FOR DOCKING POSITION #3

PROFILE VIEW

21' FRAME SPACING THROUGHOUT
SCALE: 1/8"=1'0"

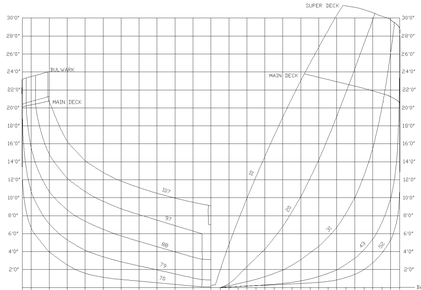
TABLE OF PAINTED SURFACES	
SHELL BELOW BOOT TOPPING (INCL. RUDDER)	8411 SQ FT
BOOT TOPPING	2056 SQ FT
SHELL ABOVE BOOT TOPPING & BULWKS	7130 SQ FT

△3

△4 △6

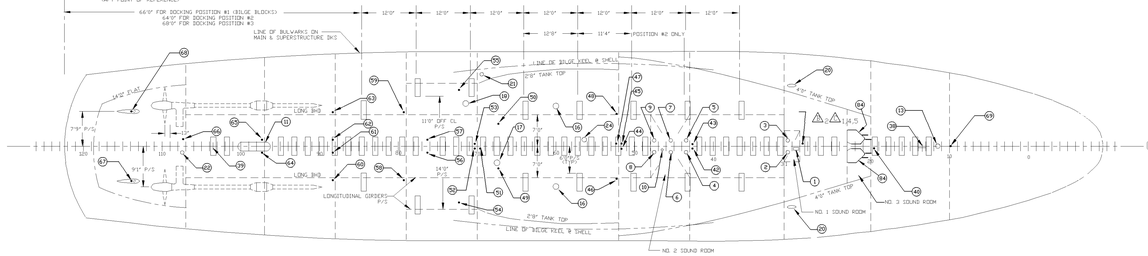
BEARING ON BLOCKS

SUPPORT	POSITION #1	POSITION #2	POSITION #3
KEEL BLOCKS (14" x 24" BEARING)	14,448 SQ IN (43 BLOCKS)	13,440 SQ IN (40 BLOCKS)	12,768 SQ IN (38 BLOCKS)
BILGE BLOCKS (14" x 24" BEARING)	5376 SQ IN (16 BLOCKS)	5376 SQ IN (16 BLOCKS)	5376 SQ IN (16 BLOCKS)
TOTALS	19,824 SQ IN	18,816 SQ IN	18,144 SQ IN
BEARING PER SQUARE INCH BLOCKING	183.8#	193.7#	200.9#
BEARING PER SQUARE FOOT BLOCKING	11.82 T.	12.45 T.	12.91 T.
TONS DISPLACEMENT AT 13'0" DRAFT=1627 TONS			



BODY PLAN

FRS 10,20,31,43,52,70,79,88,97 & 107
SCALE: 1/4"=1'0"



PLAN VIEW

SCALE: 1/8"=1'0"

NOTE: FOR BLEEDER PLUGS SEE SECTION B-B

198	645	RAINIER	AEROJET-GENERAL SHIPYARDS, INC.
197	644	FAIRWEATHER	AEROJET-GENERAL SHIPYARDS, INC.
NA	YARD HULL NO.	SHIP'S NAME	BUILDING YARD

ART ANDERSON ASSOCIATES
NAVAL ARCHITECTS & MARINE ENGINEERS
1010 FAIRVIEW AVE. E.
SEATTLE, WA 98102
(206) 622-4525

NATIONAL OCEAN SERVICE
PACIFIC MARINE CENTER
1801 FAIRVIEW AVE. E.
SEATTLE, WA 98102

APPROVALS	DATE
CHIEF ENG BILL CAMPBELL /S/	05/30/97
PROJECT SUP CARL ION /S/	05/30/97
ENGINEER JACK FISCHER /S/	05/28/97
DRAWN BY M. KING /S/	05/27/97

USE: NOAA SHIP RAINIER ONLY

DOCKING PLAN

DWG NO: RA-S0701-2-2 REV: D

SIZE: D SCALE: AS NOTED SHT 1 OF 1